

Blues may be *diluted*, as *Smalt* and *Bise*; and *Masticut*, which is Yellow, may be made more faint: And even *Vermilion* it self may, by too much grinding, be brought to the colour of *Red-lead*, which is but an Orange colour, which is confest by all to be very much upon the Yellow. Now, though perhaps somewhat of this *diluting* of *Vermilion* by overmuch grinding may be attributed to the Grindstone, or muller, for that some of their parts may be worn off and mixt with the colour, yet there seems not very much, for I have done it on a Serpentine-stone with a muller made of a Pebble, and yet observ'd the same effect follow.

And secondly, as to the other of these operations on colours, that is, the deepning of them, Limners and Painters colours are for the most part also uncapable. For they being for the most part *opacous*; and that *opacousness*, as I said before, proceeding from the particles, being very much flaw'd, unless we were able to joyn and re-unite those flaw'd particles again into one piece, we shall not be able to deepen the colour, which since we are unable to do with most of the colours which are by Painters accounted *opacous*, we are therefore unable to deepen them by adding more of the same kind.

But because all those *opacous* colours have two kinds of beams or Rays reflected from them, that is, Rays unting'd, which are onely reflected from the outward surface, without at all penetrating of the body, and ting'd Rays which are reflected from the inward surfaces or flaws after they have suffer'd a two-fold refraction; and because that transparent liquors mixt with such *corpuscles*, do, for the most part, take off the former kind of reflection; therefore these colours mixt with Water or Oyl, appear much deeper than when dry, for most part of that white reflection from the outward surface is remov'd. Nay, some of these colours are very much deepned by the mixture with some transparent liquor, and that because they may perhaps get between those two flaws, and so consequently joyn two or more of those flaw'd pieces together; but this happens but in a very few.

Now, to shew that all this is not *gratis dictum*, I shall set down some Experiments which do manifest these things to be probable and likely, which I have here deliver'd.

For, first, if you take any ting'd liquor whatsoever, especially if it be pretty deeply ting'd, and by any means work it into a froth, the *congeries* of that froth shall seem an *opacous* body, and appear of the same colour, but much whiter than that of the liquor out of which it is made. For the abundance of reflections of the Rays against those surfaces of the bubbles of which the froth consists, does so often rebound the Rays backwards, that little or no light can pass through, and consequently the froth appears *opacous*.

Again, if to any of these ting'd liquors that will endure the boiling there be added a small quantity of fine flower (the parts of which through the *Microscope* are plainly enough to be perceiv'd to consist of transparent *corpuscles*) and suffer'd to boyl till it thicken the liquor, the mass of the liquor will appear *opacous*, and ting'd with the same colour, but very much whiten'd.

Thus

Thus, if you take a piece of transparent Glass that is well colour'd, and by heating it, and then quenching it in Water, you shew it all over, it will become *opacous*, and will exhibit the same colour with which the piece is ting'd, but fainter and whiter.

Or, if you take a Pipe of this transparent Glass, and in the flame of a Lamp melt it, and then blow it into very thin bubbles, then break those bubbles, and collect a good parcel of those *lamine* together in a Paper, you shall find that a small thickness of those Plates will constitute an *opacous* body, and that you may see through the mass of Glass before it be thus *laminated*, above four times the thickness: And besides, they will now afford a colour by reflection as other *opacous* (as they are call'd) colours will, but much fainter and whiter than that of the Lump or Pipe out of which they were made.

Thus also, if you take *Putty*, and melt it with any transparent colour'd Glass, it will make it become an *opacous* colour'd lump, and to yield a paler and whiter colour than the lump by reflection.

The same thing may be done by a preparation of *Antimony*, as has been shewn by the Learned *Physician*, Dr. C. M. in his Excellent Observations and Notes on *Nery's Art of Glass*; and by this means all transparent colours become *opacous*, or *ammels*. And though by being ground they lose very much of their colour, growing much whiter by reason of the multitude of single reflections from their outward surface, as I shew'd afore, yet the fire that in the nealing or melting re-unites them, and so renews those *spurious* reflections, removes also those whitenings of the colour that proceed from them.

As for the other colours which Painters use, which are transparent, and us'd to varnish over all other paintintings, 'tis well enough known that the laying on of them thinner or thicker, does very much *dilute* or deepen their colour.

Painters Colours therefore consisting most of them of solid particles, so small that they cannot be either re-united into thicker particles by any Art yet known, and consequently cannot be deepned; or divided into particles so small as the flaw'd particles that exhibit that colour, much less into smaller, and consequently cannot be *diluted*; It is necessary that they which are to imitate all kinds of colours, should have as many degrees of each colour as can be procur'd.

And to this purpose, both Limners and Painters have a very great variety both of Yellows and Blues, besides several other colour'd bodies that exhibit very compounded colours, such as Greens and Purples; and others that are compounded of several degrees of Yellow, or several degrees of Blue, sometimes unmixt, and sometimes compounded with several other colour'd bodies.

The Yellows, from the palest to the deepest Red or Scarlet, which has no intermixture of Blue, are pale and deep *Masticut*, *Orpament*, *English Oker*, *brown Oker*, *Red Lead*, and *Vermilion*, *burnt English Oker*, and *burnt brown Oker*, which last have a mixture of dark or dirty parts with them, &c.

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